Tools & Resources Summary

Books

Title	Best Use	Comments
Architectural Graphic Standards, Ninth Ed., John Hoke ed. (AIA and Wiley & Sons 1994).	Shading masks.	
ASHRAE Handbook of Fundamentals (American Society of Heating, Refrigerating and Air-Conditioning Engineers 1993).	*The* standard technical reference for calculation procedures, material properties, weather tables and much more.	Extremely tough reading—suitable for technical audience only.
ASHRAE HVAC Applications Handbook (American Society of Heating, Refrigerating and Air-Conditioning Engineers 1995)	Assistance for mechanical system design and maintenance procedures.	Geared for engineers.
Building Control Systems by V. Bradshaw (Wiley and Sons 1985).	General reference for all building systems. Especially useful for load calculation method, economic analysis method, and basic principles.	
"Building Systems Automation-Integration," Proceedings of the 1991 and 1992 International Symposiums (University of Wisconsin-Madison 1993).	One of the only integrated controls case studies around.	Mostly a series of research reports and theory related to design tools on the distant horizon.
The Building Systems Integration Handbook edited by Richard D. Rush (Wiley and Sons 1986).	Good information on designing integrated building systems, with many case studies.	Prepared and sponsored by the American Institute of Architects.
Concepts and Practice of Architectural Daylighting by F. Moore (Van Nostrand Reinhold 1985).	Helpful for physical models. Includes good explanation of basic lighting principles.	Readable. Nice example buildings. Geared for architects.
Concepts in Architectural Lighting by M.D. Egan (McGraw-Hill 1983).	General tips in window and interior design for good daylighting. Good treatment of basic lighting principles.	Easy to read, friendly graphics. For architects and lighting designers.
Daylight in Architecture by B. Evans (McGraw-Hill 1981).	General design tips.	Geared for architects. The Egan and Moore books are better.
Daylighting: Design and Analysis by C. Robbins (Van Nostrand Reinhold 1986).	Physical models. Includes many tables of sky data and other detailed information.	Technical. Not well-suited for the average designer.

Books*, continued*

Title	*Best Use*	*Comments*
Energy Management Handbook by W. Turner (Fairmont Press 1993).	Good for economic method, detailed maintenance procedures, and controls. Also covers basic principles, comfort, envelope and system technical details, codes and energy analysis.	Thorough but dry. Controls section nicely addresses integration. Maintenance section covers all building systems in detail.
"Life Cycle Cost Analysis - A Guide for Architects" (AIA, Washington D.C. 1977).	Method and tables.	A useful handbook.
Low-E Glazing Design Guide by Timothy Johnson (Butterworth-Heinemann 1991).	Thorough background on high performance glazings. Some attention to applications.	Focuses heavily on manufacturing and other highly technical glazing details. Not well-suited for the average designer.
Mechanical and Electrical Equipment for Buildings, 7th Ed. by B. Stein, J. Reynolds and W. McGuinness (Wiley and Sons 1986, also out now in an 8th edition).	Good general reference for mechanical and electrical systems. Includes basic principles and energy efficiency emphasis.	Technical yet readable. Thorough.
Proceedings of the 1986 International Daylighting Conference edited by Stephen Zdepski and Ross McCluney.	Conference papers on many aspects of daylighting theory and practice.	Technical and thorough.
Residential Windows by John Carmody, Stephen Selkowitz, and Lisa Heschong (Norton 1996).	Excellent guide to new window technologies and their energy performance.	Good balance of readability and technical information.
Small Office Building Handbook: Design for Reducing First Costs and Utility Costs by Burt Hill Kosar Rittelman Associates (Van Nostrand Reinhold 1985).	Simplified, friendly guidelines for basic decisions. Appropriate for more than just office buildings, but small buildings only.	Geared for architects. Uses rules of thumb, checklists, "strategy sets," worksheets, and emphasizes beginning-to-end integration.
Solar Control and Shading Devices by Olgyay and Olgyay (Princeton University Press 1957).	Shading masks.	Example buildings are dated but still useful.
Sun, Wind and Light: Architectural Design Strategies by G.Z. Brown (Wiley & Sons 1985).	Basic and simple architectural design principles and methods. Most appropriate for smaller buildings.	Appealing graphics. Geared for architects.
Sunlighting as Formgiver for Architecture by William M.C. Lam (Van Nostrand Reinhold 1986).	Case studies.	

Simple Calculations

Name	*Best Use*	*Comments*
Two-Minute Feasibility Study (in these guidelines)	Pre-design or early schematic check that daylighting makes sense.	A good way to get started.
Window Sizing Equation (in these guidelines)	Early schematic starting point for window design.	
Cost/Benefit Nomographs (in these guidelines)	Rough idea of whether daylighting makes economic sense. Can use as a very early feasibility check or later in schematics for ballpark analysis.	Not useful once design is significantly developed - proceed with more sophisticated method after that point.
Overhang and Fin Sizing Equations (in these guidelines)	Starting point for shading devices.	Follow up with scale model testing.
Shading Masks (see *Architectural Graphic Standards*).	To study shading effectiveness and document it at the same time.	An appealing graphic method that captures a lot of data in a single diagram.
Simple Payback Analysis (consult one of the books above)	Rough suggestion of how long an efficient technology will take to pay for itself in energy savings.	Can be quick.

Complex Calculations and Software

Name	*Best Use*	*Comments*
Daylighting Calculations by Hand (information available through IES or use a lighting consultant).	An alternative to scale model photometry.	Tedious.
Daylighting Software (use a lighting consultant).	An alternative to scale model photometry.	Requires learning time and experience.
Load Calculations by Hand (information available through ASHRAE, various books above or through mechanical engineer).	Rough cut at peak demand, comparison of design alternatives.	Tedious. Not very accurate.

Complex Calculations and Software, *continued*

Name	*Best Use*	*Comments*
Energy Analysis Software (see list in Mechanical Coordination section)	Compare energy efficient alternatives, estimate energy costs, perform life cycle cost analysis, show Title 24 compliance, estimate peak power demands, disaggregate energy end uses, and compute loads for HVAC equipment sizing.	Advanced programs require extensive learning time and subsequent user experience. Simpler, easier-to-use analysis software exists but is not ideal for daylighting design. In those cases, lighting reduction due to daylighting must be estimated by the user.
Life Cycle Cost Analysis (use a consultant or see book list above).	For an accurate estimate of long term economic scenario for an energy efficient building, taking into account the time value of money.	Prefered method for economic analysis. Requires energy analysis data.
"Building Life-Cycle Cost" program (BLCC) (available from NTIS at address below).	Alternative to a hand calculation.	Requires energy analysis data.

Physical Models

Name	*Best Use*	*Comments*
Models-General	Study effectiveness of shading devices, qualitatively assess daylight and glare, measure daylight levels.	One of the best, easiest and most accurate tools available. Useful for both designers and their clients.
Shading Models (see Shading section)	Test performance of shading elements for all sun angles.	Use outdoors with sundial (in these guidelines).
Daylight Models-Qualitative (see Shading section)	View inside of model for daylight quality, glare, etc.	Use outdoors on an appropriate site.
Daylight Models-Quantitative (see Shading section)	Use photometric equipment to measure daylight levels.	Requires access to specialized equipment.

Organizations and Consultants

Name	*Best Use*	*Comments*
ASHRAE The American Society of Heating, Refrigerating and Air Conditioning Engineers Publications: (800) 248-5000, x112.	Literature, standards, codes, guidelines and monthly journal covering mechanical systems, building envelope, energy efficiency, indoor air quality and much more.	A large range of useful information and design guidelines available. Local chapters also may offer classes or other resources.
IES Illuminating Engineering Society Publications: (212) 248-5000, ext. 112.	Literature, standards, codes, guidelines and monthly journal covering lighting and daylighting.	A large range of useful information and design guidelines available. Local chapters also may offer classes or other resources.
AIA American Institute of Architects Publications: (800) 365-ARCH.	Literature, guidelines, codes, standards, monthly journal.	A small percentage of AIA materials address energy efficiency, daylighting or other high performance building topics. Local chapters may offer classes or additional resources.
Utility Company	Design assistance, incentives.	Always check with local utility about either new construction and retrofit programs before proceeding with any design project.
Manufacturers	Technical literature and specs, samples, pricing, energy calculations.	Many brochures can be found in Sweets Catalog.
Energy Consultants (California Association of Building Energy Consultants, 916-921-2223).	Daylighting expertise, software analysis, Title 24 compliance and mechanical system optimization	
California Energy Commission (CEC) (916) 654-4287.	Literature, code language, design guidelines geared for California Title 24 energy code compliance.	
Electric Power Research Institute (EPRI) (800) 525-8555.	Fact sheets, brochures, guidelines and software addressing lighting and mechanical technologies.	Especially strong offerings in lighting technologies and lighting controls.
National Technical Information Service Write to NTIS in Springfield, Virginia 22161 for a publications list.	Technical documents and guidelines.	A few materials are geared towards building performance.
BOMA The Building Owners and Managers Association Publications: (800) 426-6292.	Economic material and other publications geared to owners and operators.	

Notes